ECONOMIC COMMENTARY

Chemicals and Petroleum Refining is by far the Province's largest Manufacturing Sector

August 25, 2015

Highlights:
In 2014, Alberta's the chemicals and petroleum refining (CPR) sector had total revenues of $35.6 billion, accounting for 45% of total manufacturing revenues. Although this sector's revenues rose by two-thirds between 2004 and 2014, they are sharply lower in 2015 as lower crude oil prices get reflected in lower prices for refined petroleum products.

Alberta
Government

Overview

Alberta has one of the largest refining and petrochemical industries in Canada, characterized by modern, world-scale plants, efficient transportation systems, and access to the third largest crude oil reserve in the world and significant natural gas reserves. Alberta is home to the largest petroleum refining industry in Canada after overtaking Ontario back in 2011.

In 2014, Alberta's chemicals and petroleum refining (CPR) sector[1] was by far the province's largest manufacturing sector with total revenues of $35.6 billion, accounting for 45% of total manufacturing revenues. Petroleum refining revenues were $22.6 billion and the chemical industry's revenues were $13.0 billion. On a Gross Domestic Product (GDP) basis, this sector's share of manufacturing output is a much lower 20% to 25%[2]. However, even on a GDP basis CPR is the largest manufacturing sector. The CPR sector's contribution to overall Alberta GDP is about 1.3%.

Trends in Output, Revenues, Employment and Investment

Between 2004 and 2014, output volumes of the CPR industry declined by 1%, compared with an 18% increase in GDP for Alberta's manufacturing sector. This 10-year decline was mainly the result of a large decrease in the production of fertilizers, such as urea and styrene.

The CPR sector's GDP declined by 14% between 2004 and 2009 as a result of a shortage of ethane feedstock, capacity constraints, the global recession and falling demand for Alberta fertilizers. Output has rebounded since then, growing by 15% between 2009 and 2014, mainly as a result of a rebound in volumes of synthetic resins such as polyethylene and other ethylene polymers.

Between 2004 and 2014, the number of employees in the sector rose by 4,680 to 15,300[3], while the value of sales increased by two-thirds to $35.6 billion on higher prices.

The CPR industry's workforce declined from 10,600 employees in 2004 to 10,150 in 2009 as employment in the basic chemicals sub-sector (mainly petro-chemicals) fell by one-half. However, employment in the industry has risen steadily since 2009 to reach 15,300 in 2014. All CPR sub-sectors increased their employment levels over that period with the largest increase registered in petroleum refineries.

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[1] Includes NAICS industries 324 (petroleum and coal products manufacturing) and 325 (chemical manufacturing). About 98% of revenues in industry 324 come from petroleum refineries.

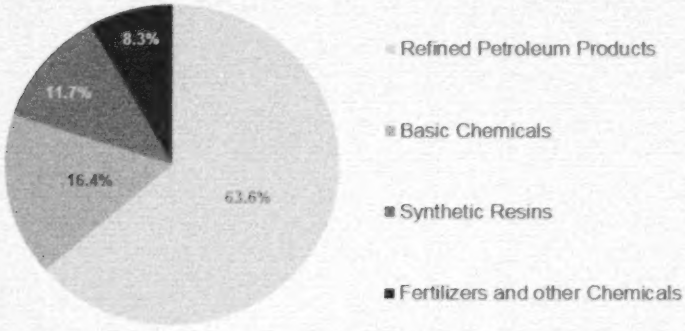
[2] The ratio of GDP to revenues is relatively low for petroleum refining due to the fact that most of that sub-sector's inputs consist of crude oil rather than labour. As a result, CPR's share is much lower for GDP than for revenues.

[3] Estimates from Statistics Canada Table 281-0024 Survey of Employment, Payrolls and Hours (SEPH)

The industry's largest sub-sectors on a revenue basis are:

- Petroleum refineries (with products such as diesel fuel and gasoline): $22.1 billion in 2014; sales increased by 123% between 2004 and 2014; fell sharply by 28% in 2009; rose 84% between 2009 and 2014
- Basic chemicals (such as styrene and ethylene glycol): $5.8 billion in 2014; rose 15% between 2004 and 2014; fell by nearly one-half between 2006 and 2009; grew by 46% between 2009 and 2014; petrochemicals' share of basic chemicals is about 60%
- Synthetic resins (such as polyethylene): $4.2 billion in 2014, up 21% from 2004; rose 19% between 2004 and 2008; fell by one-quarter in 2009; rose 39% between 2009 and 2014
- Fertilizers and pesticides: $1.8 billion in 2014, basically unchanged from 2004; more than doubled between 2001 and 2008; declined by 20% between 2008 and 2010 and also by 20% in 2014

Revenue Shares in 2014 for Major CPR Sub-Sectors



The CPR sector includes 286 businesses with employees, of which 16% have more than 50 employees. About 84% of the number of business is categorized as being small (less than 50 employees).

The CPR sector invested about $12 billion in Alberta between 2004 and 2014. Prior to 2010 the majority of investment took place in the refining sector, but starting in 2010 more has been invested in the chemical sector.

What are the largest Inputs of the CPR Sector?

In order to determine the largest inputs on a value basis of the CPR sector we examined the national Input-Output tables as there is a great deal more detail available in the national Input-Output tables than in the provincial ones. As the below shares are only available at the national level they should be viewed as a rough approximation of the Alberta situation.

For the petroleum refineries sub-sector crude oil is by far the largest input, accounting for about 74% of the total value of all inputs for this sub-sector. The next largest inputs are the two largest components of GDP, wages and salaries and corporate profits,

which together account for about 10% of the total input value. Other major inputs include pipeline transportation (3%), lubricants and other petroleum products (2%), and gas and gas liquids (2%).

For basic chemicals, the largest input is wages and salaries and corporate profits which together account for about one-quarter of the sub-sector's total input value. Other major inputs include gas and gas liquids (15%), petrochemicals (15%), lubricants and other petroleum products (7%), and other chemicals (7%).

In the synthetic resins sub-sector, petrochemicals (for instance ethylene) are the largest input with a 30% share. Wages and salaries and corporate profits account for almost 30% of the input value. Other chemicals account for almost 20%.

The number one input for the fertilizers and pesticides sub-sector is wages and salaries and corporate profits with a one-third share. Chemicals have a roughly 25% input share; most of that consists of ammonia and agricultural chemicals. Natural gas accounts for about 12% of inputs.

Markets

Approximately 40% of the sector's output is shipped to customers within the province, mainly gasoline, diesel fuel and other refinery products. A further 30% is shipped to customers in other provinces, also mostly refinery products.

Close to 30% of this sector's production is exported internationally. Although refinery products account for close to two-thirds of this sector's revenues, they account for less than 20% of exports. International exports of the CPR industry rose by more than one-half between 2004 and 2008 to $9.4 billion, mostly as a result of higher prices. The CPR industry's exports fell by 30% in 2009, as exports to the US, which account for more than 80% of Alberta's CPR exports, fell by 32%. Exports have recovered strongly since then, growing by one-half between 2009 and 2014 to a record $10.0 billion as the export values of styrene, acyclic hydrocarbons and ethylene glycol doubled. Year-to-date 2015 (through June) CPR exports have fallen by about 3% compared to the first half of 2014. Exports have fallen far less than total sales because refinery products have a fairly low share in total CPR exports.

The following commodities had the highest export sales values in 2014:

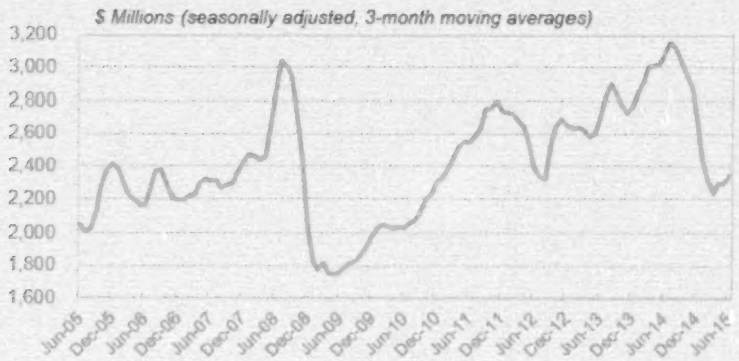
- Ethylene polymers (other than polyethylene): $2.5 billion in 2014; up 101% from 2004
- Ethylene glycol: $1.5 billion; up 31%
- Polyethylene: $1.2 billion; up 43%
- Diesel fuel and other fuel oils: $808 million; up 143%
- Saturated acyclic hydrocarbons (such as pentanes, butanes, ethane): $555 million; up 187%
- Anhydrous ammonia: $528 million; up 113%
- Styrene: $426 million; down 6%

The sector's largest international export markets are the US, with an 85% export share, followed by China (8%) and Mexico (3%).

How is the CPR Sector performing in 2015?

This sector's revenues are sharply lower in 2015 as lower crude oil prices get reflected in lower prices for such refinery products as gasoline and diesel fuel. CPR revenues fell by 22% in the first half of this year, compared with the same period of 2014 (Chart 1): refined petroleum product sales fell 36% and sales of chemicals 4%.

Chart 1
Value of Sales by the Chemicals and Petroleum Refining Industry



Major Indicators for the Chemicals and Petroleum Refining Industry

	2004	2009	2013	2014	% Change 2004-2014
Revenues ($Millions)	21,194	22,139	32,746	35,605	68%
- Petroleum Refining	10,137	12,286	20,437	22,646	123%
- Chemicals	11,057	9,853	12,309	12,959	17%
GDP (Millions of constant $)	3,994	3,437	3,894	3,960	-1%
- Petroleum Refining	1,824	1,743	1,752	1,841	1%
- Chemicals	2,170	1,694	2,142	2,120	-2%
Number of companies (with employees)	320	270	274	286	
Number of jobs	10,621	10,152	14,664	15,299	44%
- Petroleum Refining	2,611	3,328	6,150	6,449	147%
- Chemicals	8,010	6,824	8,514	8,850	10%
Capital investment ($Millions)	N/A	635	1,044	1,199	N/A
- Petroleum Refining	N/A	440	363	398	N/A
- Chemicals	N/A	195	681	801	N/A
International exports ($Millions)	6,161	6,633	9,095	10,034	63%
- Petroleum Refining	734	1,271	1,510	1,628	122%
- Chemicals	5,427	5,362	7,585	8,406	55%

Source: Statistics Canada